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ON THE ENDANGERED INDIAN TROUT *BARILIUS BOLA* (HAM.)¹

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(With a text-figure)

The Indian trout *Barilius bola* (Ham.) is well known as one of the finest food and game fishes of India. It is presently rather rare in its natural habitat. The conservation of mahseer has fortunately begun to receive attention all over India, but lamentably, the Indian trout has not received equal attention and may become extinct. It is, therefore, essential that extensive biological and ecological investigations should be undertaken to determine the areas where the fish is still surviving and devise ways and means to conserve the species, before it is too late.

NOMENCLATURE

Considering the sporting qualities and also the shape of the body, mouth and the colour of *B. bola*, British anglers synonymised it with the trout, but to distinguish it from the real trout of their country, they called it the Indian trout of family Cyprinidae. Taxonomically it has no relation with the real trout which belongs to a different family, Salmonidae, and does not naturally occur in India. Indian trout is not the only fish which is erroneously associated with the name 'trout'. The so-called snow trout and hill trout (Tilak and Sharma 1982) are two other examples of such erroneous association. These two, belonging to sub-family Schizothoracinae, are also taxonomically far apart from the family of the real trout. Why these bottom-dwelling forms are awarded the honourable suffix 'trout' is not clear.

The scientific name of the Indian trout has also gone through several changes. Hamilton (1822) originally described the fish as *Cyprinus bola* but McClelland (1839) named the genus as *Opsarius*. Day (1878) designated the fish as *Barilius bola* (Ham.). Surprisingly, Jordan (1918) preferred to perpetuate its Assamese local name 'Rajahmas' by renaming the fish as *Raiamas bola*, based on the characteristics of the cleft of the jaw. Hora (1937), however, accepted McClelland's change, but put the new generic name as a subgenus giving the fish a longer name *Barilius (Opsarius) bola*. Later, Day's nomenclature was again approved by several other authors. (Menon 1974, Jayaram 1981). However, the latest preference seems to be for 'Raiamas' following the contention of Howes (1980). Despite all these changes, I have, in this paper, followed Day's terminology, as it is the one that has been commonly used for more than a century.

Like the confusing taxonomic position of the Indian trout, its local names too are numerous. Though Hamilton took the Bengali

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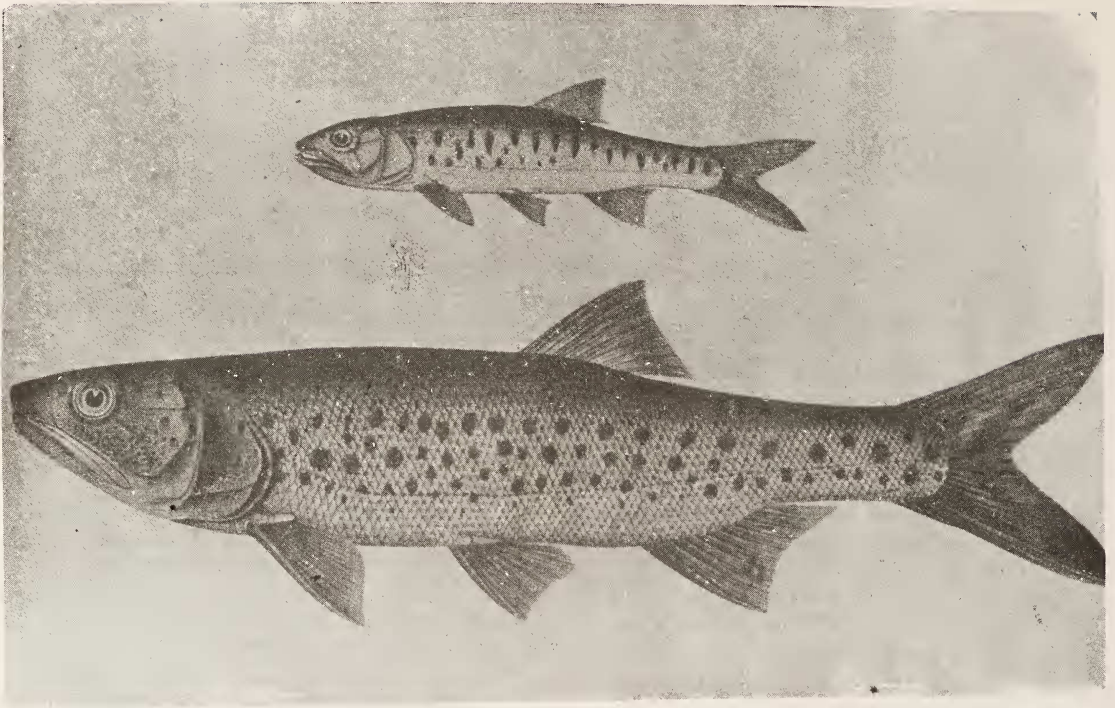


Fig. 1. Indian trout *Barilus bola* (Ham.).

name 'bola' as its specific name, 'gotha' is also its alternate name in the same region. Its Hindi and Oriya equivalents are 'buggarah' or 'buggah' but in Uttar Pradesh it is referred to as 'gulabi machchhi'. In Assam it is known as 'korang' and also as 'rajahmas'. Recent findings indicate that fishermen at Jawad near Neemuch and Rampura on the Gandhi Sagar reservoir (both in Madhya Pradesh) call the fish 'gallar.'

Distribution and morphology: Day, following Hamilton's account, mentioned the geographic distribution of the fish as Bengal, Orissa, Assam, North-West Provinces, Nepal and Burma. But its occurrence in Jamuna, Chambal, including its tributaries and lakes and streams of Rajasthan was not recorded in scientific literature till its mention by Evans (1926).

Like the real trout, Indian trout is morphologically an elegant, small, streamlined fish about 30-40 cm in length and is equally ap-

preciated as a table fish. Day (loc. cit.) reports capture of the fish in Assam up to 5 lbs in weight, whereas McDonald (1948) confirms having caught fish up to 3 lbs in Burma. Fishermen at Rampura affirm that the fish normally attains a weight of 1 kg. Even at this low weight the fish is admirable as food as well as for sport. Its silvery colouration with spots on either side of the body is quite attractive, with pink coloured fins, the lower lobe of the caudal being brighter and edged with a black line. Spots on the sides become more outstanding only in preserved specimens. The sub-terminal jaw and large eyes add to the attractiveness of the fish (see Fig.1).

Sporting qualities: As a sport fish, its qualities are *par excellence*. It takes fly or any other shining bait as quickly or even more quickly than the European trout. It was observed that if a bait or even a piece of white cloth tied

to a rod and line is moved over the surface of water where the fish exists, it follows the bait and tries to snap it when close enough. Evans (1926) in a letter published in 1831-32 in the *Oriental Sporting Magazine* (U.K.), recorded occurrence of the Indian trout in great abundance near Neemuch, where the British Army was stationed. The officers of this station enjoyed every week-end, the enviable treat of catching dozens of Indian trout in a couple of hours on artificial fly, on the banks of the Chambal river. The letter also quoted a record of "the enormous number of 51 dozens of fine trout" caught in a day's fishing by three anglers. On another occasion 19 dozen per head were landed by two anglers. Such was the tremendous voracity of the fish and also its astounding abundance in rivers in those days. Thomas (1897) also commented on the sprightly behaviour of the fish in north Indian rivers.

Transplantation: Despite these wonderful sporting qualities, the fish at present is sadly neglected. Because of its piscivorous habit, it was not considered as a cultivable species and hence was completely ignored; so much so that it is almost driven to extinction and the Directorates of Fisheries hardly know anything about the species. Considering this serious situation, it was decided to study its ecological requirements and spawning behaviour. Based on the information available through Evans (1926) and the co-operation of the Director of Fisheries, Madhya Pradesh and his officers, a small number of fingerlings were collected from a stream near Jawad (a neighbouring village of Neemuch) in November 1974 and brought to Lonavla (dist. Pune), which had incidentally the same altitude as Neemuch (Kulkarni 1975). After growing the fingerlings in a nursery pond for about five months, they were released into the nearby Walwhan reservoir, having a waterspread of about 560 ha. Two years later they were observed to breed near the small feeder streams of the lake. A small batch of fingerlings was grown in a pond for further studies.

Biological account: The fish is piscivorous and rarely touches the conventional groundnut-oil cake or rice polish, but pounces avidly on small loaches, chilwa and even small berils. Mosquito larvae and other insects appeared to be their favourite food in early stages. They followed even the butterflies hovering over the surface of the water. In short, they went after everything that was alive. Dead fish and green algae were left alone. By nature it is largely a riverine fish, frequenting shallow marginal waters for hunting small fishes. In lacustrine conditions it inhabits upper columns of lake waters and the marginal areas to facilitate feeding on live matter. However, the rapacious nature of the fish indicates that it might take to artificial feed of animal origin, especially small pieces of dry fish soaked in water, after some amount of training as in the case of murels.

Like the major carps, *B. bola* breeds in the early part of the monsoon when the rivers and streams are flooded with fresh rainwater. Observations made during breeding of the fish in confined water (ponds) indicated that it matures in the second or third year. Other significant findings were that though there was no sexual dimorphism, the male assumes brighter nuptial colours and develops bright spots and tubercles on its opercular portion. Another feature is that the scales of the male on both sides of the body develop tubercles or warts which make the body rough to touch. This enables identifying the sex by merely touching the fish without taking it out of the water. Tubercles and the opercular spots disappear after the breeding season. The body colours also decrease in brightness.

The characteristics of the eggs, their hatching and larval development have been studied by Kulkarni and Ogale (1978). It was observed that though the fish does not naturally breed in ponds, it responds to hypophysation (breeding with the help of pituitary hormone injections). Hence multiplication of the species on a large scale will not be difficult. Its spawning behaviour in natural streams has not so far been

reported except for observations made at the feeder streams of the Walwhan reservoir. Nevertheless, on the basis of these observations it can be assumed that the fish does not require special conditions for spawning except clear (clean) running water of streams and warm (26°-28°C) temperature for hatching of eggs, which are much more delicate than those of major carps.

Depletion: Not being a specialised fishery, the extent of depletion of the fish cannot be statistically ascertained for lack of species-wise estimates of its production. But the general information I have gathered through personal correspondence as well as direct conversation during fisheries seminars, have unquestionably shown that the fish has become rare and is not even noticed by fishery workers (especially from north Indian states). Dr. A. G. K. Menon of the Zoological Survey of India informed me in a personal communication that the fish was really endangered. He has included it in his list of endangered species. Biologists cannot wait for any further proof of depletion of an entirely aquatic animal which cannot normally be seen or make its presence or absence felt by any means. Even crocodiles are better off in that respect. It is essential, therefore, that fishery biologists should note the possibility of extinction of this outstanding fish and take early steps for its survival.

The causes of depletion are largely the countrywide pollution of our waters by different types of effluents and the pressure of population seeking increased quantity of fish as food. Eggs of this fish being more delicate and requiring more oxygen during hatching, compared to ordinary carps, are mortally affected by polluted waters. Added to that is the indiscriminate killing of brood and juvenile fish by the fishermen themselves through ignorance. Unfortunately many other freshwater fishes also are meeting the same dismal fate.

Action plan for conservation: Although the need for conservation of the species has thus been established, the appropriate agency to

tackle the problem and take the necessary steps for conservation requires to be identified. In my opinion State Fisheries departments instead of restricting themselves to a few cultivable species, should expand their horizons and cultivate this excellent table fish, as is recommended for murrel culture. Moreover, some states would like to have in the lakes of their hill-stations some trout-like popular game fish to attract tourist traffic. Research institutes under the I.C.A.R. (Indian Council of Agricultural Research) should therefore sponsor a few projects for more intensive biological and ecological investigations on the fish in its natural habitat, namely, the streams and rivers in northern India, and consider ways and means to conserve the fish. Universities in the same region could also undertake short-term projects under the sponsorship of the U.G.C. (University Grants Commission) to study the biology of the fish in detail. The I.C.A.R. can as well utilise their Agriculture cess-funds for this purpose, for sponsored research projects.

In the meanwhile, regional angling associations should arrange to have fingerlings of the fish collected and stock their protected waters to verify and confirm its reputation as an extraordinary game fish. Especially, central organisations like the Angling and Aquatic Conservation Society of India should undertake breeding the fish in their fish farm, if any, and distribute fingerlings to other waters, so that it can be perpetuated for the benefit of future generations. Financial assistance from the Ministry of Environment & Forests could also be sought for the above purpose at Bhadkhol or any other suitable reservoir. Enlightened private sector units like the Tata Electric Companies which have done such commendable work for the conservation of the mahseer should divert their efforts to the Indian trout also.

Hora (1937) had given an exhaustive account of the species but unfortunately no attention was thereafter drawn to the problem of its depletion and need for conservation. However,

ecological and socio-economic conditions in India have changed during the past four or five decades. It is, therefore, only by an all-out effort that more information can be collected about the Indian trout and the measures required taken for

its conservation. If crocodiles can be protected, the Indian trout has a greater claim, but a complete ban on killing the fish is not recommended for various reasons, largely because we want to protect the fish as well as the fisherman.

REFERENCES

- DAY, F. (1878): The fishes of India. London.
- EVANS, F. (1926): Fishing in Lonavla. *J. Bombay nat. Hist. Soc.* 31: 828-830.
- HAMITON, F. (1822): An account of the fishes found in the river Ganges and its branches. Edinbuegh. pp. 266-276.
- HORA, S. L. (1937): The Game fishes of India, Part I. *J. Bombay nat. Hist. Soc.* 39(2): 199-210.
- HOWES, G.S. (1940): A new genus of cheline cuprinid fishes. *Bul. Br. Mus., nat. Hist. (Zool.)* 38(3): 171-173.
- JAYARAM, K.C. (1981): The fresh water fishes of India. *Zool. Survey of India, Calcutta.*
- JORDAN, D.S. (1918): New Genera of Fishes. *Proc. Acad. Nat. Sci. Philadelphia*, Vol. lxx : 344.
- KULKARNI, C.V. (1975): Introduction of Indian trout in Lonavla waters. *J. Bombay nat. Hist. Soc.* 72: 572-575.
- KULKARNI, C.V. & OGALE, S.N. (1978): Feeding, growth and early development of the Indian trout, *Barilius (Opsarius) bola*. *J. Bombay nat. Hist. Soc.* 75: 266-272.
- MCCLELLAND, J. (1839): Indian Cyprinidae. *Asiatic Researches, Calcutta*, 19: 295-298; 415-429.
- MCDONALD, A.S.T.J. (1948): Circumventing the mahseer and other sporting fish in India. Bombay Natural History Society, Bombay.
- MENON, A.G.K. (1974): A check list of fishes of the Himalayan and the Indo-gangetic plains. *Inld. fish. Soc. Calcutta*. 1975.
- TILAK, R. & SHARMA, U. (1982): Game fishes of India and angling. Dehradun.
- THOMAS, H.S. (1897): The Rod in India. Third edition. London.